

REMARKS

Claims 1, 5 and 8 are amended. Claims 1-20 and 40-61 are pending in the application.

Claims 1-20 and 40-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Srinivasan, U.S. Patent No. 5,731,235 in view of European Patent No. 886308 (Kobayashi). The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 1-20 and 40-61 are allowable over Srinivasan and Kobayashi for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every limitation in any of those claims.

As amended, independent claim 1 recites forming a first capacitor electrode, forming a silicon nitride comprising layer over the first capacitor electrode and after forming the silicon nitride comprising layer oxidizing the substrate to form a silicon oxide comprising layer over the silicon nitride comprising layer. Claim 1 further recites exposing the silicon oxide comprising layer to an activated nitrogen species to introduce nitrogen into at least an outermost portion of the silicon oxide comprising layer. The amendment to claim 1 is supported by the specification at, for example, the paragraph bridging pages 8 and 9. Srinivasan discloses formation of a

silicon nitride layer 14 having pin-holes 16 which can extend through the layer (col. 3, ll. 13-24). Srinivasan further discloses utilization of wet acid etching with phosphoric acid to widen the pin-holes to allow filling of such holes during a subsequent chemical vapor deposition of silicon layer 20 (col. 3, ll. 30-47). Srinivasan does not disclose or suggest the claim 1 recited oxidizing the substrate after forming a silicon nitride comprising layer to produce a silicon oxide comprising layer over the silicon nitride comprising layer.

As indicated at page 9 of applicant's specification, the recited oxidation after forming nitride comprising layer 20 can effectively fill pin-holes within layer 20 with silicon oxide derived from the underlying first capacitor electrode material. Accordingly, the recited method can advantageously eliminate utilization of an etching step such as that disclosed by Srinivasan and can thereby avoid utilization of wet etching acid such as phosphoric acid. Nothing in the Srinivasan disclosure suggests utilization of the recited oxidation step to form a silicon oxide comprising layer after forming a silicon nitride layer. Nor does the Srinivasan disclosure provide a basis for a reasonable expectation that the recited oxidation could successfully achieve formation of the silicon oxide comprising layer and effective filling of pin-holes in the silicon nitride layer.

As indicated by the Examiner at page 4 of the present action, Kobayashi is relied upon as showing a nitridation of silicon oxide using a plasma. As combined with Srinivasan the Kobayashi disclosure of

nitridation of silicon dioxide does not contribute toward suggesting the claim 1 recited forming of a silicon oxide comprising layer over a silicon nitride comprising layer by oxidizing the substrate after forming the silicon nitride comprising layer. Nor does Kobayashi contribute toward providing a basis for a reasonable expectation of achieving the resulting silicon oxide comprising layer and effective filling of pin-holes within the silicon nitride layer. Accordingly, independent claim 1 is not rendered obvious by the cited combination of Srinivasan and Kobayashi and is allowable over these references.

As amended, independent claim 5 recites forming a silicon nitride comprising layer over a first capacitor electrode and oxidizing the substrate to form a silicon oxide comprising layer over the silicon nitride comprising layer. As amended, independent claim 8 recites forming a first capacitor electrode material comprising silicon over a semiconductor substrate, forming a silicon nitride comprising layer over the capacitor electrode material, and oxidizing a portion of the first capacitor electrode material to produce a silicon oxide comprising layer over the silicon nitride comprising layer and effective to fill pin-holes with the silicon nitride comprising layer. Independent claim 15 in its original form recites forming a silicon nitride comprising layer and subsequently oxidizing the substrate effective to fill pin-holes with silicon oxide material and form a silicon oxide layer on the silicon nitride comprising layer. Each of independent claims 5, 8 and 15 are

allowable for at least reasons similar to those discussed above with respect to independent claim 1.

Dependent claims 2-4, 6-7, 9-14, 16-20 and 40-61 are allowable over the cited combination of Srinivasan and Kobayashi for at least the reason that they depend from corresponding allowable base claims 1, 5, 8 and 15.

For the reasons discussed above, pending claims 1-20 and 40-61 are allowable. Accordingly, applicant respectfully requests formal allowance of such pending claims in the Examiner's next action.

Respectfully submitted,

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